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ELAN MICROELECTRONICS CORPORATION

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

ELAN MICROELECTRONICS CORPORATION, Plaintiff, v. APPLE, INC., Defendant. AND RELATED COUNTERCLAIMS	Case No. 09-cv-01531 RS **DECLARATION OF ROBERT DEZMELYK IN SUPPORT OF ELAN MICROELECTRONICS CORPORATION'S OPENING CLAIM CONSTRUCTION BRIEF** DATE: June 23, 2010 TIME: 1:30 p.m. JUDGE: Richard Seeborg CTRM: 3, 17th Floor

I, Robert Dezmelyk, declare and state as follows:

1. I have been retained by Elan Microelectronics Corp. ("Elan") as an expert witness in this lawsuit. I am providing this declaration to describe the technology relevant to an understanding of the patents in suit and to state my opinion regarding the level of ordinary skill in the art to which

the patents are addressed and the meanings that terms or phrases used in certain patents would have to one of ordinary skill in the art to which the patents pertain.

2. I earned a bachelor's degree from the Massachusetts Institute of Technology, where I was enrolled in a special program for the study of computer-based control systems. In 1980, I founded LCS/Telegraphics and have been its CEO since then. LCS is a leading supplier of input device software and consulting services. During the 1990s, I created software code for operating system drivers for touchpads from all of the leading manufacturers, including Synaptics, Inc. and the Cirque Corp. subsidiary of Alps Electronics. I have also written software and firmware code to control the operation of a variety of other kinds of touch sensitive input devices, such as digitizing tablets and touchscreens. As such, I am very familiar with the structure and operation of touch sensitive input devices as described in the asserted patents.

3. Each of the patents in suit relates to various aspects of touch sensitive input devices. In my opinion, one of ordinary skill in the art for all of those patents would have at least a bachelors' degree in electrical engineering, or computer science with course work in electronic circuits, and have three years of experience in the design and operation of touch-sensitive input devices. One with a more advanced degree might have less practical experience. As the basis for my opinion, I rely on my experience with others in the field and the background of witnesses who testified under oath in the *Elantech v. Synaptics* case.

SUMMARY OF TASK AND MATERIALS CONSULTED

4. I have reviewed the disputed terms from the asserted claims of the patents in suit as disclosed in the parties' February 5, 2010 Joint Claim Construction Statement. In addition to the Joint Claim Construction Statement and materials cited in that document, I have reviewed the parties' Disclosures of Claim Construction and Extrinsic evidence and the cited material, the patents in suit and their file histories, and certain of the prior art cited in the patents or by the parties in their disclosure of invalidity contentions. I also base my opinions on my experience in the field and knowledge of relevant technology.

BACKGROUND OF RELEVANT TECHNOLOGY

5. The patents relate generally to touch sensitive input devices. Touch-sensitive input devices implemented in a variety of technologies have long been used as input devices for computers and other electronic devices. In general, a touch sensitive input device comprises a flat panel, which may be transparent and mounted over a computer display, that can detect the presence of a user's finger or other object like a stylus. These devices can also determine the location of the contact on the surface. That information, along with information regarding the previous position of the object, is used to provide input to a computer to control, for example, the cursor location or the engagement of virtual buttons. Many different methods of determining the presence of a finger and its location have been developed. I will describe in more detail two of the most popular: Resistive sensing and capacitive sensing.

A. Resistive Touch Sensors

6. Resistive touch sensors, in the most common case, have two sheets of slightly flexible plastic that is either partially conductive itself, or has a partially conductive coating. The sheets are kept a very small distance apart, often by an array of tiny spacers on the surface of the lower sheet, so that no contact occurs between them until the user either presses his finger or a stylus on the surface of the upper plastic sheet. At least one of the sheets is designed to have sufficient resistance so that a voltage can be placed across the sheet with a minimal current flow through the sheet. Along the axis which has a voltage placed across it, the voltage will vary from the full value of the voltage on one side, near the voltage source, to about zero on the other side. The voltage will vary proportionally according to the distance from the voltage source, so that midway between the sides of the sheet the voltage is exactly one half of the input voltage. As shown in the diagram below, when the user's finger touches the upper sheet it deforms downward and contacts the lower sheet, making an electrical connection with the lower sheet. At that point in time, the voltage present on the lower sheet can be measured. Because the measured voltage will be proportional to the position of the touch point in one of the x or y directions, the ratio of the measured voltage to the total voltage is the same as the ratio of the touch position to the total width of the resistive sheet. In order to measure both the X and Y coordinates, it is necessary to repeat the

measurement process on the other axis. In that case, the voltage may be impressed on the bottom sheet, and the voltage is measured on the top sheet.

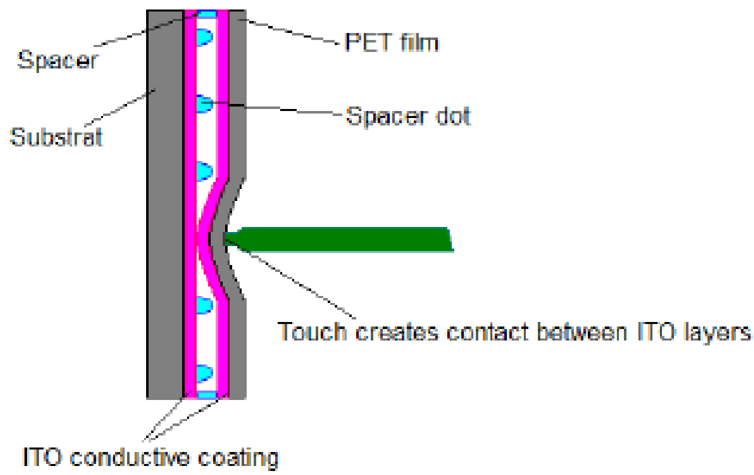

Figure 1 - Cross section view of a resistive touch sensor.

7. The simplest design, named after the number of connecting wires required, is a 4-wire sensor where the upper sheet has the voltage for one axis impressed upon it, and the lower sheet is used for the opposite axis.

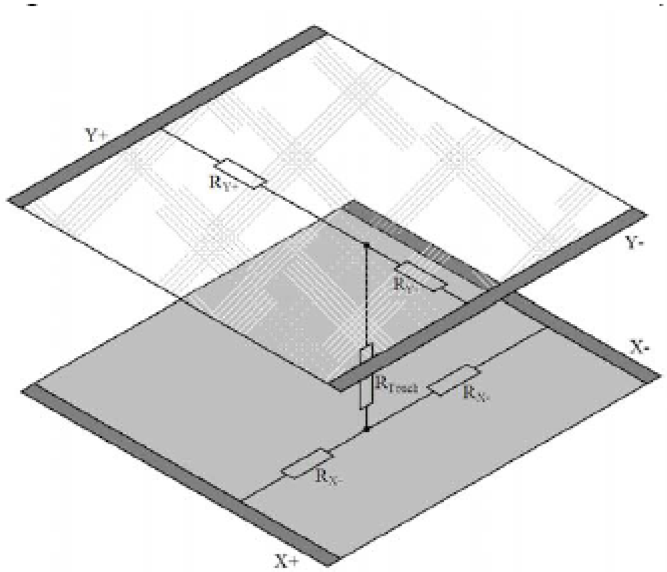

Figure 2 - The effective circuit formed when a touch occurs showing the two conductive sheets for X and Y and their electrodes.

8. Actual touch screen designs typically use more complex techniques for impressing voltage on the sheets and sensing the voltage that results from the voltage divider, in an effort to remove errors that result from unwanted resistance in parts of the signal path, and susceptibility to electrical noise. Often two pairs of electrodes are placed at the corners of the lower sheet, and a single connection to the upper sheet is used to sense the voltage that results from the user's touch. This design requires five connecting wires.

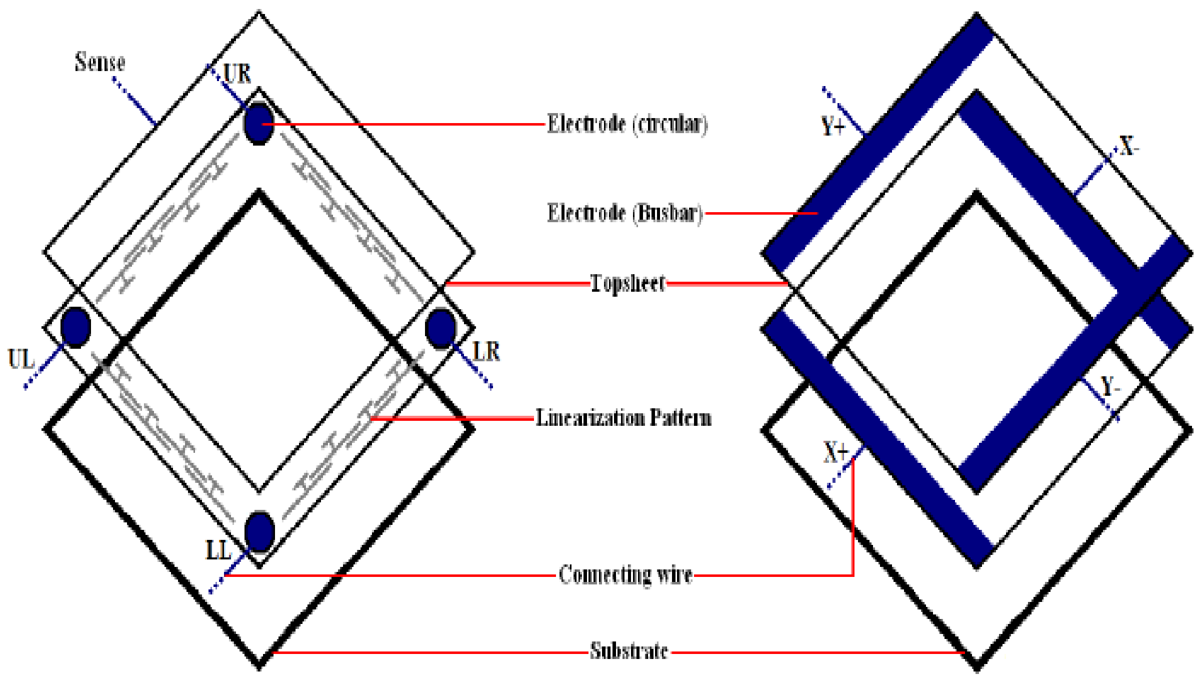

Figure 3 - Design differences between a five wire touchscreen (left) and a four wire touchscreen.

9. Measuring sequentially for the X and Y axis the voltage which results from the voltage divider created by the user's touch generates a set of location coordinates. The numerical values of these coordinates reflect the digital encoding which is assigned by the analog to digital converter used to convert the voltage. Typically, coordinate values range from 0 - 1024 in each axis. There is no intrinsic relationship between locations on the surface of the sheet and the values generated by the controller, because they are derived from properties of the sheet as a whole.

10. In practice, the voltage is alternately applied to each axis of the touch surface, and in each instance a measurement is taken for each axis to determine the coordinates of the location. The location of the finger or other object, expressed as coordinates using the chosen coordinate system,

is referred to as the "absolute position" of the finger or stylus. In a typical resistive touch screen this operation is performed more than 100 times a second, and the absolute position may be reported for each measurement period. In addition, a touch sensor may also determine the "relative position" of a finger or stylus by comparing the current location to the last known location and calculating the difference (e.g. ΔX, ΔY). Relative position information is often used to determine the movement of a cursor on a display screen when the touch sensor is a part of a touchpad.

11. Often the function of determining the position of the touch on the resistive touch sensor is performed by a dedicated circuit or a microprocessor with firmware that performs the functions of sequencing the drive voltages to the sensor, measuring the values of the voltages in X and Y that result from a touch, and generating output data signals representing the user's input. These touch sensor controllers also perform filtering processes to eliminate inaccurate position data that may be generated when the user begins and ends a touch, or that may be generated by electrical noise. The touch sensor controllers also often have functions to scale the coordinates they output to match a specified numerical range, and to allow the origin of the coordinates to be specified so that the coordinate data output by the touch sensor controller can be aligned with an underlying display. Touch sensor controllers may also examine the sequence and timing of the user's contact with the surface, as determined by the controller's scanning of the sensor, in order to generate a simulation of the actions of traditional mouse buttons, based on the user's interaction with the touch sensor.

12. Resistive touch sensors are very inexpensive to manufacture, and are responsive to both finger touches and contact with a stylus. They can be manufactured in sizes from an inch square to over four by six feet, but they have several disadvantages. First, the resolution of the coordinate data depends on the accuracy with which the voltage created by the voltage divider can be measured. Using large resistive touch screens, it can be difficult to maintain adequate spatial resolution. Also, the materials used in resistive touch sensors are less robust than those used in other kinds of touch sensors, less transparent, and the deflection of the material as the finger touches it gives the device a different ergonomic feel than devices with harder surfaces. Finally, resistive sheet touch sensors cannot detect the position of the user's finger as it approaches the touch sensor, or is held in close proximity to the sensor. In addition, the resistive sheet sensors cannot determine

the correct position if the user touches the sensor at two or more locations.

B. Capacitive Touch Sensors

13. For capacitive sensing technologies, I will describe the physical components of a representative device and explain the theory of operation in which such a device senses a user contact, determines the location of that contact and tracks movement of the contact until it is terminated.

14. A human body is conductive, acts like a capacitor and affects the capacitance of conductive objects close to the body. Capacitive touch sensors utilize these qualities to detect when and where a finger touches them. There are several different kinds of capacitive touch sensors. In a simple implementation analogous to the resistive touch sensor, a single sheet of partially conductive material is driven with a rapidly changing voltage on its four corners. When the user touches the sensor, a minute amount of alternating current flows into the user's finger as a result of the user's body capacitance. The relationship between the voltage and position, at the particular frequency, is analogous to the relationship between the voltage and position for a five wire resistive touch sensor. Because the effective resistance at the sensing frequency in the circuit formed at the touch point is fixed for the duration of the measurement, the ratio of the currents flowing into the electrodes relative to the total current is proportional to the position, in both axes, of the touch. This sensing approach provides a very rapid way to determine the location of the user's touch. In practice, however, it is difficult to implement. As with resistive sensors, the accuracy of the X and Y coordinates depends on how accurately the currents can be measured, and on how even the resistance of the touch sensor surface coating is. Precise measurement of the currents of the drive signals is also difficult, due to the presence of electrical noise in the environment, and the tendency for the noise and other electromagnetic effects to distort the electric field on the surface of the sheet. Like the resistive touch sensors, capacitive touch sensors determine a numerical value of the coordinates for the touch location by converting the analog current measurements into digital values and performing the necessary comparisons and calculations. Typically, coordinate values range from 0 - 1024 in each axis. In other words, the touch surface can distinguish the location of the user's touch within approximately 1000^{th} of the length of each axis of the touch screen. For a

touchscreen which is ten inches wide, the position of the user's finger can be determined within about one hundredth of an inch. The advantages of this kind of capacitive sensor include low cost, robustness (because the sheet can be a very hard material), rapid sensing of the position of the user's finger and very good transparency.

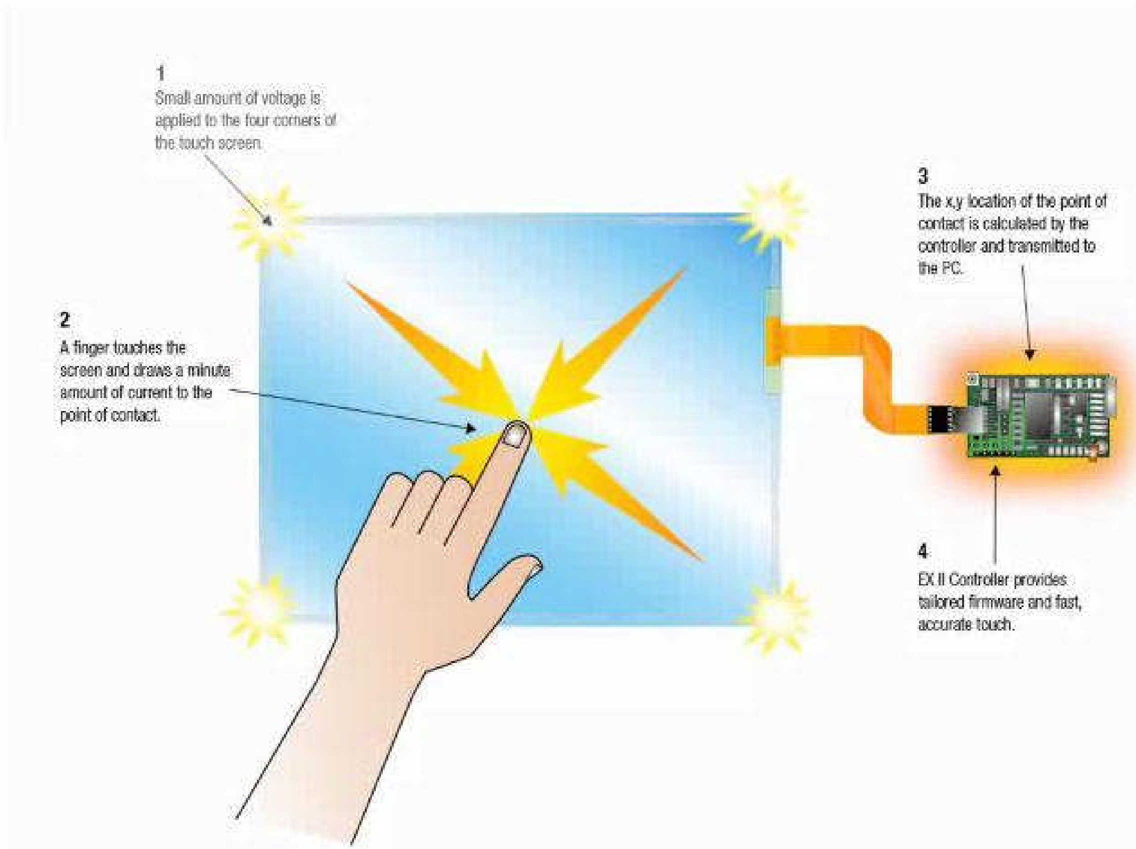

Figure 4 - An overview of how a surface capacitive sensor operates.

15. A more common kind of capacitive touch sensor, often called a projected capacitance sensor, uses electrodes formed in a pattern underneath the touch surface. The touch sensor measures either the change in capacitance between electrodes, or the extent to which the signals in one or more electrodes are coupled to other electrodes as a result of the presence of the user's finger. The diagrams below show how the presence of the user's finger increases the capacitance between an electrode and its neighbor (shown as a ground plane in the simplified example in Figs. 5 and 6).

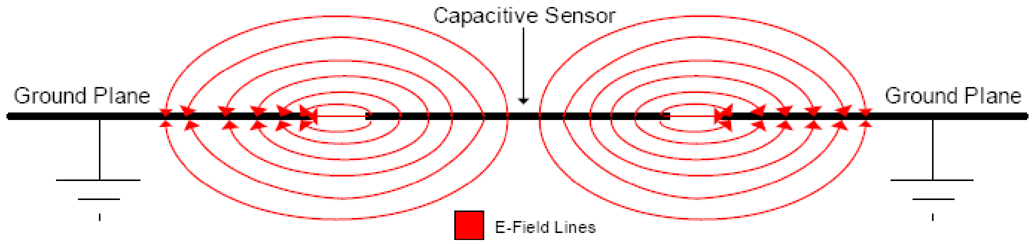

Figure 5 - Electric field lines between electrodes before the user touches the sensor

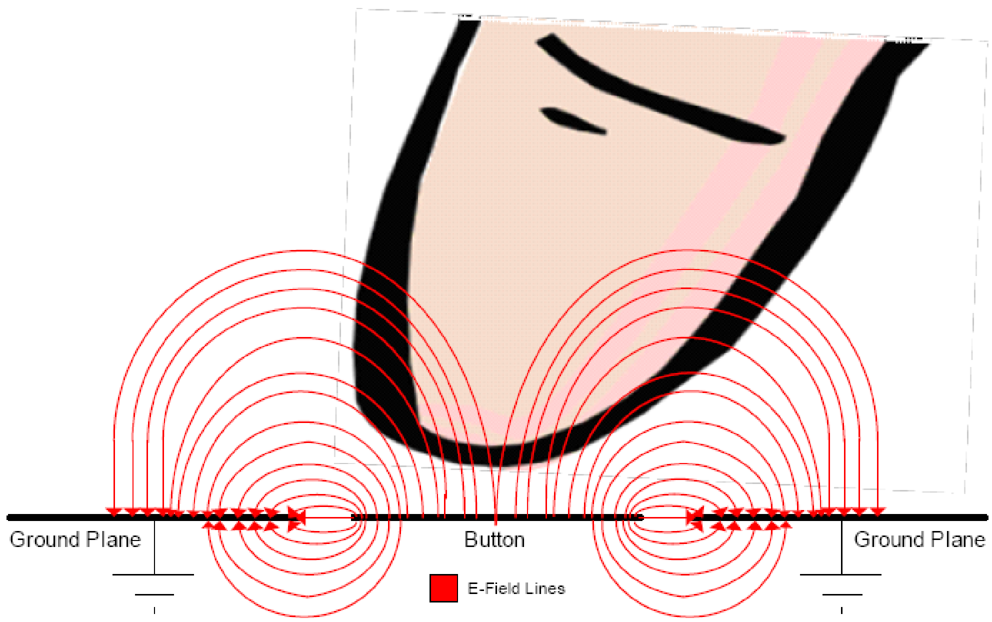

Figure 6 - The increased density of electric field lines increases the capacitance between the electrodes

16. A variety of different electrode patterns may be used. The shape of the electrodes is an important aspect of the overall design of the sensor. Conceptually, however, for purposes of a basic understanding of the technology, the electrodes can be considered as a grid of lines running perpendicular to each other. The most common sensors are actually arrays of diamond-shaped conducting elements. In this example, the blue diamonds are connected together along lines in the X direction, while the red diamonds are connected together along lines in the Y direction. Thus, they are analogous to a grid of blue horizontal lines and red vertical lines, and those in the field often discuss them in this way.

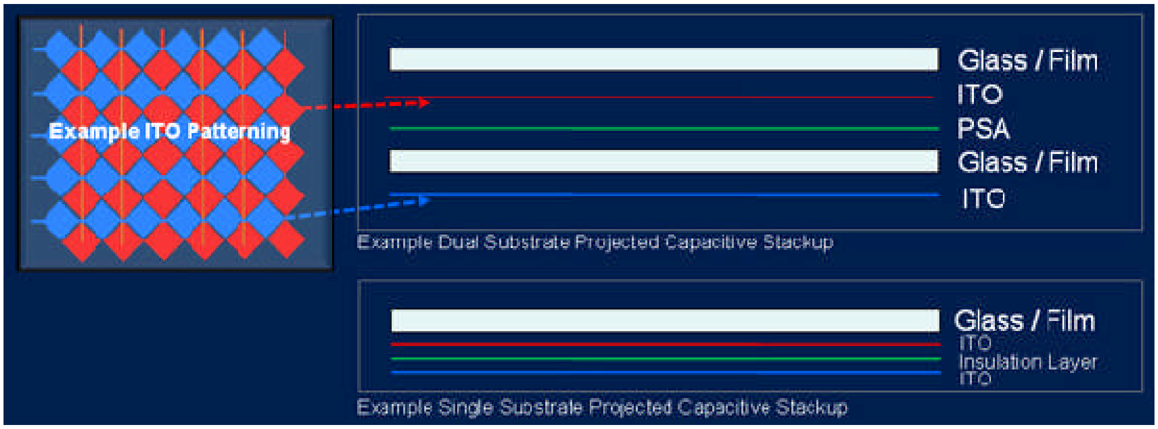

Figure 7 - A typical electrode pattern for a projected capacitance touch sensor, and cross section views of the sensor

17. For all of these sensors, the effect of placing a finger on or near the sensor electrodes is to create a varying amount of capacitance or capacitive coupling that is related to the distance from the electrode to the finger. In order to determine the location where the user is touching, the capacitive coupling (or the change in capacitance) is measured by scanning the sensor elements. The capacitance measured at each sensor trace is converted from an analog signal into a digital value. Once all of the sensor traces have been scanned and converted, the result is a number of capacitance values in each of the x and y directions. The controller then analyzes this data to determine the finger location and other operative data, such as the amount of pressure applied to the surface. In the simplest possible design, the single line with the greatest capacitance change is used as the coordinate in each direction (X or Y). Such a sensor would only provide a very limited set of locations, i.e., no more that the number of grid lines for each axis.

18. In reality, determining finger location requires a more complex calculation. Capacitive touch sensors are able to use the measurements of the amount of the change in capacitance at a set of neighboring electrodes to determine the location of the contact with much greater precision. The measured capacitance can be visualized as a graph with capacitance plotted against the dimensions of the touch surface. Graphs may show capacitance in the X and Y directions separately, resulting in a pair of curves, or simultaneously, as a "hill." Capacitive touch sensors typically determine the finger location by calculating the coordinates of the centroid of the curve or "hill." The centroid for an axis is calculated by adding up the products of the change in

capacitance at each sensor trace, multiplied by the coordinate of the trace, and then dividing that total by the total of the changes in capacitance. The accuracy of determining the location for a projected capacitance sensor depends on how accurately its controller can measure the change in capacitance (or coupling) between electrodes, not just on the location or number of electrodes.

19. The pressure applied for each contact, called "z" data, can be determined by calculating the width under the curve or the area under the hill. The harder a finger is pressed, the more it will spread out, contacting a greater area of the touch surface.

20. Capacitance measurements can be taken along horizontal and vertical traces, or by individual sensors arranged under the sensor surface. For example, US Patent no. 5,463,388 to Boie et al. ("Boie") discloses a method for calculating the location of the finger touch using the centroid of the measured capacitance values on a capacitive touch sensor which has a rectangular array of sensing electrodes, Fig. 1 shows a graph of the capacitance measurements taken at each sensor in four-by-four array of sensors. Point 111 is the contact location calculated from the capacitance measurements:

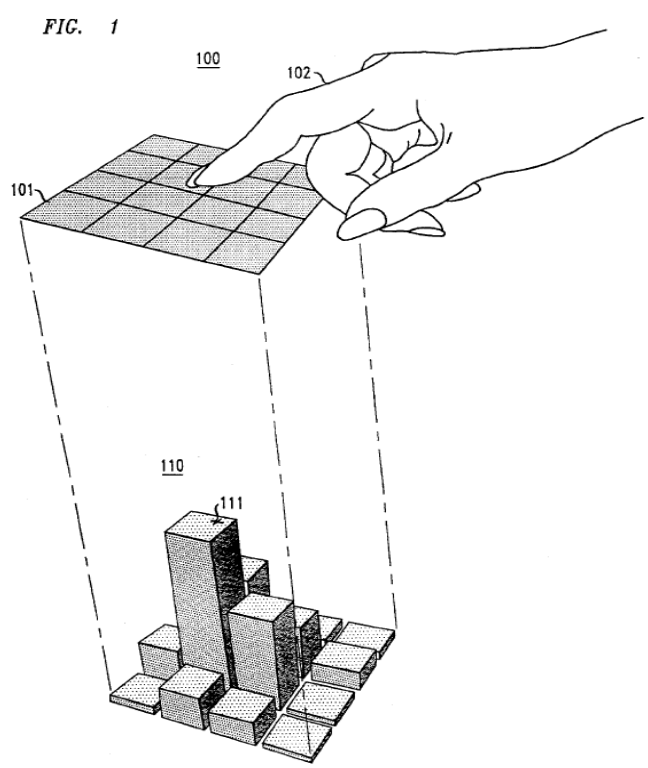

Figure 8: Figure 1 from Boie showing capacitance measurements.

Boie describes how to compute the centroid for a sensor which returns a capacitance value for each electrode in its sensing array as well as a sensor which connects the sensing electrodes into rows and columns. *See* Boie at 3:5-15 and 5:25-56. Boie also describes how the electrodes can be electrically connected so that a one-dimensional profile is created along each axis. A copy of the Boie patent is attached hereto as Exhibit 1.

21. The illustration below shows the profiles of capacitance that would occur when three fingers are placed on a capacitive touch sensor.

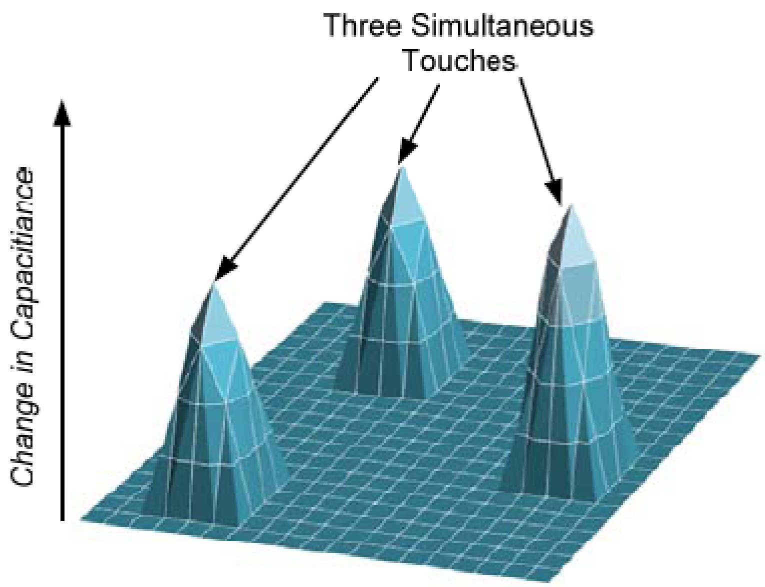

Figure 9: An example of how fingers touching a projected capacitance touch sensor affect the capacitance on the surface.

22. Capacitive touch sensor controllers also perform a number of processing steps to ensure that the positional, touch presence, and button simulation data that they report are as accurate as possible, and to provide data in a format that is most useful to the system receiving the input data reports. Touch screen controllers typically filter the initial set of raw readings in order to remove noise. They also often further process or filter the coordinates they determine by averaging or other processes in order to output more stable, accurate position information. In addition, the controllers repeatedly scan the sensor to obtain position and touch data at a rate high enough that the data they report represents the motion of the user's hand, and the number of fingers touching the sensor.

Some projected capacitive touch sensor controllers also determine how many individual fingers or other body parts are touching the sensing surface, and what the locations and even shapes of their areas of contact are. The controllers also examine the sequence and timing of the user's contact with the surface, as determined by the controller's scanning of the sensor, in order to generate a simulation of the actions of traditional mouse buttons based on the user's interaction with the touch sensor.

23. A practical advantage of this kind of capacitive touch sensor is the ability to use a variety of materials for the touch surface. The sensor can be built with the electrode pattern on a traditional printed circuit card mounted behind just about any non-conductive material, or it can be formed from the patterned deposition of a transparent conductive material like indium tin oxide onto the back surface of a glass window. This kind of sensor can also be used to determine the location of multiple points of contact, and it can recognize the approach of a finger and the presence of a finger very close to the surface. Analysis of the size and shape of the regions where high capacitive coupling exists can also be used to infer how hard the user is pressing on the surface.

PATENT CLAIM TERMS

The '218 Patent

24. The '218 patent claims a touch sensitive input device that can be used to control the location of a cursor on the computer screen as an alternative to the traditional computer mouse or trackball. According to the patent, previous touch-sensitive input devices relied on mechanical buttons – like the buttons on a mouse -- to provide click, double-click and drag operations. 1:50-2:15.[1] The '218 patent discloses that various patterns of user contacts with the touchpad itself can be interpreted as button states (up or down), so that mechanical buttons are not required. For example, a short "tap" can be interpreted as a button click, and a button down signal followed by a button up signal can be sent to the host. In addition, two short taps in quick succession can be interpreted as a "double tap" where the sequence reported to the host will be button down, button up, button down, button up. Also, a short tap followed by a longer contact where the finger moves

[1] Citations to the patents will take the form X:Y-Z where X is the column number and Y-Z are the line numbers.

can be interpreted as a "drag" operation in which the button is reported down, and information relating to cursor movement is provided to the host. In other words, the length of a user's contacts with the touch surface, as well as the length of any gap between contacts, is used to emulate mechanical buttons. *See* 2:43-61; 5:6-36

25. Claim 1 of the '218 patent is a method claim while claim 5 is an apparatus claim. Both claims require "distinguishing between a first cursor control operation, a second cursor control operation and a third cursor control operation based upon the duration of . . . contact and gap intervals." 13:34-48 (claim 1); 15:37-41 (claim 5).

26. In my opinion, the term "cursor control operation" means "providing positional data to effect movement of the cursor (i.e. cursor tracking operation)." One of ordinary skill in the art would understand that term on its face to involve controlling the movement of the cursor on a display screen. Reading the patent specification confirms my understanding. At 6:9-13 the '218 patent expressly states that a "cursor control operation" is a cursor tracking operation. Cursor "tracking" refers to controlling the movement of the cursor on the screen to reflect the user's interaction with the input device. The '218 patent states, "[t]hus, positional data relating to the user's contact with the touch-sensitive input device is supplied to the computer system in order to effectuate cursor movement on the computer screen." 6:14-17. Nowhere in the patent is the phrase "cursor control operation" used to describe operations that do not involve providing positional information[2]. Rather, when the patent describes button functions (click, double click, etc.) it uses the term "control operation." Thus I understand that the inclusion of the word "cursor" in the phrase "*cursor* control operation" refers to control of the cursor on the screen, i.e. its location and movement, rather that operations performed at a particular location, such as selection of an object (click) or launching a program or routine (double-click).

The '659 Patent

27. I understand that the parties have provided different proposed constructions of the claim element "sensors configured to map the touchpad surface into native sensor coordinates." In

[2] If "cursor control operation" could mean a button function, like a click, then the method described in the patent at column 6, lines 9 - 13 to determine whether a tap or cursor tracking occurred would be non functional.

the first place, in my opinion, one of ordinary skill in the art would understand "native sensor coordinates" to mean coordinates indicating the absolute position of an object on or near the touch pad." As the patent explains, the coordinates are used to determine the point where the finger makes contact with the touchpad surface. 2:17-25 (x,y coordinates define the position of a finger for a Cartesian coordinate system, for polar coordinates the radius r, and the angle θ define the position of a finger); Those coordinates (x,y, r,θ, etc.) are calculated from the data acquired from the sensors and reflect a point on the surface of the touchpad. *See* 2:49-52 "The sensors of the touch pad 36 are configured produce signals associated with the absolute position of an object on or near the touch pad 36. In most cases, the sensors of the touch pad 36 map the touch pad plane into native or physical sensor coordinates 40." 5:38-48.

28. Apple's proposed construction does not clarify or further define this term. Rather, Apple substitutes the term "sensor coordinates of the touchpad" for the claim term "native sensor coordinates." In my view the phrase "sensor coordinates" implies the coordinates of the sensors themselves. While the sensors may be located at particular coordinates, those locations do not define the native sensor coordinates, because the sensors are configured to provide data that allows a finger position to be detected with considerable accuracy when the finger location is between the physical sensors.

29. In my opinion, "sensors configured to map the touchpad surface into native sensor coordinates" would be understood by one of ordinary skill in the art to mean "sensors configured to produce signals indicating native sensor coordinates." The patent explains that "The touch pad assembly includes a touch pad having one or more sensors that map the touch pad plane into native sensor coordinates. The touch pad assembly also includes a controller that ... receives the native values of the native sensor coordinates from the sensors..." 3:24-30 The mapping of the surface into native sensor coordinates depends upon the kind of sensor, and the design of the sensing electronics, as discussed above.

30. In my opinion, "logical device units" would be understood by one of ordinary skill in the art to mean "discrete user actuation zones representing areas of the touchpad encompassing groups of native sensor coordinates." The patent explains that "clusters of native sensor coordinates

... define one logical device unit." 10:23-25 and "[i]n most cases, the raw number of slices in the form of native sensor coordinates are grouped into a more logical number of slices in the form of logical device units (e.g., virtual actuation zones). 10:42-45 This definition is consistent with the use of this term by those skilled in the art and with the description in the patent.

The '352 Patent

31. In my opinion, the "means for selecting an appropriate control function" limitation found in Claim 19 of the '352 patent has a structure which consists of Analog multiplexer 45; Capacitance measuring circuit 70; A/D convertor 80, Microcontroller 60; and/or software, firmware or hardware performing the claimed function. Practitioners of ordinary skill in the art at the time of the filing of the '352 patent, based on their training, and the techniques already known to them, would know how to program controller firmware, driver software running on the host or the like in order to assign particular control functions to specific gestures, where the gestures are defined by combinations of the number of fingers detected, the amount of time the fingers are detected[3], and any movement of the fingers. The '352 patent sets forth a number of possible assignments of functions to gestures, and provides algorithms for determining the number of fingers detected, the amount of time during which the fingers are detected in contact, and the position and movement of the fingers on the touchpad, and explains that "[i]f a control function is intended, the specific control function can then be identified. 12:11-13. The patent explains how the combinations of finger contacts shown in Figure 7 can be assigned to "any number of cursor movement and control functions" including "cursor movement", a "select" function, a "drag" function, a "double-click" function, a click of a middle button, a right mouse button click, a "multi-sequence function", such as scrolling, an "ink" function, and the "entry of variable values". *See* 13:1-57. The listed control functions themselves were well known to practitioners at the time the application for the '352 patent was filed, and they all existed in the prior art. The select, drag, double-click, middle button click, and right mouse button click functions all had standardized representations both at the device level and at the host system software level which involved setting and clearing single data bits either in

[3] As an example, the '218 patent which describes methods to generate button values based on the timing and duration of finger contact with a touchpad is prior art to the '352 patent.

data packets reported by the device to the host, or in data structures in the host memory. The cursor movement, scroll, ink and entry of variable values functions also all had well known standardized representations both at the device data packet level and at the host system software level which involved setting one or two (in the case of the cursor coordinates) variables in a the standardized data structure.

32. The patent provides Figs. 8 and 9 as an example of a flowchart illustrating the software or firmware to perform the claimed function, which it also states is analogous to the flowcharts of Figs. 5 and 6. In particular, Figs. 8 and 9 illustrate the sticky dragging gesture illustrated in Figs. 7F-1 and 7F-2, but is "applicable to the remaining functions". 13:59-61. One of ordinary skill in the art would understand Figs. 8 and 9 to be an example, and would know how to adapt or modify the flowcharts shown to reflect the particular sensing devices, host computer and application programs to implement an appropriate control function.

33. The patent also explains that the function of selecting an appropriate control function, like the other aspects of the claimed invention, can be performed in firmware running on the microcontroller 60, but can also be implemented as software running on the host, 15:74-16:5, or in hardware logic. 7:1-3.

34. In addition to hardware, software or firmware implementing the necessary steps, the patent also discloses that the sensing hardware is associated with this function. The processing of Fig. 8 starts at step 405 to "scan the conductors; store in RAM." Fig. 8-1; 14:3-6. The patent states that this step is achieved using the multiplexer, capacitance measuring circuit, and A/D convertor under the control of the microcontroller 60. "Under the control of microcontroller 60, the analog multiplexor 45 selects which traces of the matrix 30 will be sampled, and the output of those traces is then supplied to a capacitance measuring circuit 70." 5:32-35. The A/D converter supplies the signal to the microcontroller to "form, among other things, a finger profile for one or more fingers, X-Y cursor data, and control signals." 5:50-52. The repetitive scanning of the touchpad generates "...a series of scans in which one or more fingers [are] found to be either present or absent in any given scan, with motion, or lack thereof, of the finger or fingers across the touch sensor interspersed between changes in the number of fingers in contact with the touchpad." 12:5-9. In light of this

extensive disclosure of methods of selecting an appropriate control function based on a user's contacts with the touch pad, and the knowledge of those skilled in the art in the area of integrating input devices to host programs, it is my opinion that the '352 patent discloses ample structure corresponding to the function of "selecting a control function based upon a combination of a number of fingers detected, an amount of time said fingers are detected, and any movement of said fingers."

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on May 7, 2010, at Newton, New Hampshire.

/s/ Robert Dezmelyk
Robert Dezmelyk

Citations for illustrations:

Figure 1 - 3: Atmel Applications Note AVR341 Four and five wire Touch Screen Controller © 2007 Atmel Corporation

Figure 4: Surface Capacitive Touch - 3M website
http://solutions.3m.com/wps/portal/3M/en_US/TouchSystems/TouchScreen/Technologies/Touch/

Figure 5, 6: Cypress Semiconductor, Capacitive Sensing 101, published Oct. 2006

Figure 7: Cypress Semiconductor http://www1.cypress.com/?id=1938&rID=39280

Figure 8: US Patent 5,463,388, Figure 1

Figure 9: Projected Capacitance Touch Screen Technology
http://www.oculardisplaysystems.com/touch-screen/crystal-touch-article.asp

FILER'S ATTESTATION

Pursuant to General Order No. 45, Section X (B) regarding signatures, I, Sean P. DeBruine, attest that concurrence in the filing of this document has been obtained.

/s/ Sean P. DeBruine

Sean P. DeBruine

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